the thin, transparent, colorless, spiral shell of the nuclear stage could be seen along with the active animal. The operculum was observed attached to the foot. These newly hatched veligers evidently did not survive more than a day or so. Finally, the detritus at the bottom of the jar was filtered and over 100 of the minute nuclear spiral shells were recovered. These were mounted in slides using the technique for mounting foraminifera.

The ability to keep these small bivalved gastropods alive from 22 August to 12 October (52 days) in a different type of sea water seems worthy of record even though Dr. Kawaguti stated he had raised them through five generations in his laboratory. Obviously, these animals must have considerable tolerance to varying conditions of temperature and sea - water content.

Following Dr. Kawaguti's instructions, the jars were placed in full light during the day but away from direct sunlight. As portions of the Caulerpa died and became colorless, they were removed. Water was changed every three or four days, gradually by decanting and re-filling with new normal salt water from the Aquarium. No attempt was made to aerate the water in the jars or to oxygenate it. Although all specimens of <u>B. limax</u> finally died, a fair amount of the Japanese <u>Caulerpa</u> is still in fairly good condition at this writing (29 October, 1960).

On their arrival and for a considerable time afterward the living animals were active and continued to feed on the alga. Occasionally, one would crawl up the side of a jar and across the water at the top, clinging to the meniscus. On two or three occasions an animal would drop down from the meniscus and hang by a thread of mucus a half inch to an inch long, finally dropping down to a branch of the alga or to the bottom of the jar. The bright green color of the animal and shell maintained for many days. The round adductor muscle scar was seen easily through the transparent shell. When fresh and active the animals are difficult to see, especially the smaller ones, as they blend so perfectly into their normal habitat. Toward the end of the experiment, however, the shells of living animals began to whiten and generally lose the brilliant gem-like green color. After death this green color was lost almost completely.



Notes on the Habitat of Berthelinia spec. nov. from the Vicinity of La Paz, Baja California, Mexico

by

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Living Berthelinia was first discovered on 3 August, 1960, at about an eight-foot depth close to shore among large blocks of lava broken away from the adjacent lava wall at the north end of the fine sand beach of Bahia Candelero, Isla Espiritu Santo. A small loose roll of a feathery type of green alga (Caulerpa sp. ?) was brought up from the bottom by Sra. Mary Lou Adcock, which on careful search produced several small living specimens. Because this type of alga grows in great quantity in the sand and on dead coral chunks of the Bay, and was not at all prevalent in the rocky terrain, operations were transferred to the sandy area, a move of not more than 100 yards from the point of discovery. Large masses of Caulerpa were brought up from five to eight feet of water and placed in a large plastic bucket. Search of this produced more living specimens, along with a few living specimens of the sacoglossan Oxynoe. Temperature of the water was 82-84° F., with air temperature about the same.

Some of the living <u>Berthelinia</u> were placed in a plastic gallon-sized thermos jug along with a mass of the <u>Caulerpa</u> for transportation to San Francisco by plane the following day. Additional masses of the <u>Caulerpa</u> were thrown into buckets for transportation to San Francisco to permit later search for more specimens.

Unfortunately, the specimens of <u>Berthelinia</u> and <u>Oxynoe</u> did not survive. The <u>Caulerpa</u> was thickly inhabited by a small species of sea anemone which died also. Upon later careful sorting, the total of living specimens of <u>Berthelinia</u> found was brought up to nearly 40. The <u>Caulerpa</u> was inhabited also by quantities of minute mollusks, mostly gastropods with some pelecypods; occasional nudibranch egg masses were also noted. These were shaken out and preserved so as to obtain as complete a sample of the fauna as possible.

Opportunity was afforded to try for living <u>Berthelinia</u> again on 4 October. This time operations centered in the vicinity of Bahia Puerta Ballandra, on the mainland of the peninsula north of La Paz. The sand of this bay did not

have the masses of the feathery type of Caulerpa similar to those in Bahia Candelero, on Isla Espiritu Santo. However, small patches of it were growing on the volcanic rocks in quite shallow water adjacent to the north end of the sand beach. This Caulerpa was clean of the troublesome small anemone but careful search produced no Berthelinia. In the same general area, however, small patches of a different species of Caulerpa occurred, growing at the sides and between the lava boulders. This was a "bunch-grape" type, quite similar in its dark blue-green color and general characters to the Japanese Caulerpa okamurai. A major difference, however, was the flat, circular ends occurring in many but not all of the terminal branches of this alga. Berthelinia was discovered in this alga in some quantity and in size from juveniles to at least one presumed adult specimen with a shell length of 8.45 mm. Water temperature at this location was 82-83° F., with air temperature 84° F. It is worthy of note that our specimens were found under exactly the same conditions described for bivalved gastropods collected alive by Kawaguti in Japan and by Burn in Victoria, Australia.

A quantity of the alga from Bahia Puerta Ballandra was also brought home in a canvas bucket and search of this brought the number of specimens collected in this bay to about 50. The alga also produced a number of juvenile Oxynoe and several specimens of a grayishcolored nudibranch an inch or so in length.

The living specimens of <u>Berthelinia</u> and <u>Oxynoe</u> were brought aboard the boat and close-up photographs taken with an Exacta camera fitted with rings and using electronic flash. This proved to be somewhat difficult under conditions that had to be improvised, but mainly because the animals of both species were extremely active, crawling over each other and continually getting out of focus and upsetting the composition of the picture.

Although the same attempt was made to bring both species back alive for laboratory observation, this again proved unsuccessful, due perhaps to putting too much <u>Caulerpa</u> in the plastic thermos in relation to the quantity of water. It is reasonably certain, if this situation is corrected, that it will be possible to maintain live specimens of this Berthelinia in the laboratory, possibly by using an injection of oxygen during transportation similar to the technique followed in shipping small tropical fish by air. Such a procedure will be tried with the next opportunity to collect Berthelinia alive and transport it. Perhaps it should be mentioned that small amounts of a type of <u>Caulerpa</u>, similar to, but smaller and lighter green in color, than the species from Bahia Puerta Ballandra, was found among masses of the feathery type collected in Bahia Candelero. It is not certain whether <u>Berthelinia</u> lives on this species normally in preference to the common species of the feathery type. Certainly this opisthobranch mollusk is not at all common on the latter type and specimens collected are quite small in size.

Samples of the types of <u>Caulerpa</u> collected in the La Paz region have been submitted for identification to Dr. George Papenfuss, Botany Department, University of California.

California State Regulations on Collecting Abalone

by

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In view of Keith Cox's splendid paper on abalone, reviewed in this issue, conchologists and collectors should be familiar with the requirements for taking them legally. The California law and the regulations of the State Department of Fish and Game establish seasons, minimum sizes and bag limits for the taking of abalone for sport (non-commercial) purposes. Under present sportfishing regulations the minimum legal sizes are as follows; red, 7; green, $6\frac{1}{4}$; pink, 6; black, 5; and all other species, 6 inches in greatest shell diameter. Open season is March 16 to January 14. Limit is five abalones in combination of all species. "Fishing" hours are from one-half hour before sunrise to onehalf hour after sunset. Special requirements include (1) carrying an accurate measuring device; (2) abalones of less than minimum size, if detached, must be replaced without delay on their original locations with the shell uppermost; (3) legal-sized abalones must be brought ashore above high water mark attached to their shells and alive; (4) no transportation or possession of abalones not in their shells, except when being prepared for immediate consumption; (5) no device longer than '36 inches, commonly called an abalone iron, can be used; (6) SCUBA divers cannot take abalones in California north of Yankee Point, Monterey County; and (7) last and by no means least is the pos-.